



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,238	01/26/2004	Jun Hirose	247640US3 CONT	6690

22850 7590 09/22/2006

C. IRVIN MCCLELLAND
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

ZERVIGON, RUDY

ART UNIT PAPER NUMBER

1763

DATE MAILED: 09/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/763,238

Applicant(s)

HIROSE ET AL.

Examiner

Rudy Zervigon

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. <u>8/14/2006</u> . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____. | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-3, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Welch; Michael D. et al. (US 6,192,827 B1) in view of Osaka et al (JP11-037315) and Maa (USPat. 4,771,805). Welch a vacuum processing apparatus (Figure 1; column 2; lines 10-21) for generating a plasma comprises a vacuum processing chamber (24; Figure 1; column 4; lines 10-21) having a stage (220; Figure 5; column 6; lines 59-67) for mounting a substrate to be subject to a plasma processing, and a carrier port (54; Figure 2; column 4; lines 22-40) for providing access to and from the stage (220; Figure 5; column 6; lines 59-67), said apparatus, comprising: a deposit shield (50; Figure 3B; "chamber liner") disposed along an inner peripheral wall (a chamber "liner" must line the chamber inner wall 50, Figure 2,8) of the vacuum processing chamber (24; Figure 1; column 4; lines 10-21), said deposit shield (50; Figure 3B; "chamber liner") having a notch portion (94,96; Figure 9,10) at a position facing the carrier port (54; Figure 2; column 4; lines 22-40); a shutter (60; Figure 2; column 4; lines 22-40) being shaped to fit into the notch portion (94,96; Figure 9,10) of the deposit shield (50; Figure 3B; "chamber liner"), an inside surface of the shutter (60; Figure 2; column 4; lines 22-40) is substantially flush with an inside surface of the deposit shield (50; Figure 3B; "chamber liner"), wherein each of the deposit

Art Unit: 1763

shield (50; Figure 3B; “chamber liner”) and the shutter (60; Figure 2; column 4; lines 22-40) is configured to have a ground potential (column 8; lines 9-14), the shutter (60; Figure 2; column 4; lines 22-40) is configured to be retreated from the notch portion (94,96; Figure 9,10) when moving the substrate in and out of the stage (220; Figure 5; column 6; lines 59-67) through the carrier port (54; Figure 2; column 4; lines 22-40) and configured to be fitted into the notch portion (94,96; Figure 9,10) of the deposit shield (50; Figure 3B; “chamber liner”) when the plasma processing is conducted, thus surrounding a plasma generation region by an even curvature of the shutter (60; Figure 2; column 4; lines 22-40) and deposit shield (50; Figure 3B; “chamber liner”) thereby producing a uniform plasma – claim 1. It is noted in advance, when the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Welch further teaches:

- i. A vacuum processing apparatus (Figure 1; column 2; lines 10-21) for generating a plasma comprises a vacuum processing chamber (24; Figure 1; column 4; lines 10-21) having a stage (220; Figure 5; column 6; lines 59-67) for mounting a substrate to be subjected to a plasma processing, and a carrier port (54; Figure 2; column 4; lines 22-40) for providing access to and from the stage (220; Figure 5; column 6; lines 59-67), said apparatus, comprising: a deposit shield (50; Figure 3B; “chamber liner”) disposed along an inner peripheral wall (a chamber “liner” must line the chamber inner wall 50, Figure 2,8) of the vacuum processing chamber (24; Figure 1; column 4; lines 10-21), said deposit shield (50; Figure 3B; “chamber liner”) having a notch portion (94,96; Figure 9,10) at a position

- facing the carrier port (54; Figure 2; column 4; lines 22-40); a shutter (60; Figure 2; column 4; lines 22-40) being shaped to fit into the notch portion (94,96; Figure 9,10) of the deposit shield (50; Figure 3B; "chamber liner") and being configured to be elevated, wherein, when the shutter (60; Figure 2; column 4; lines 22-40) is substantially flush with an inside surface of the deposit shield (50; Figure 3B; "chamber liner"), – claim 2
- ii. A shutter (60; Figure 2; column 4; lines 22-40) mechanism (150+160+100; Figure 2) configured to raise the shutter (60; Figure 2; column 4; lines 22-40) into the notch portion (94,96; Figure 9,10) of the deposit shield (50; Figure 3B; "chamber liner") when the plasma is generated in the vacuum processing chamber, thereby closing the carrier port (54; Figure 2; column 4; lines 22-40) – claim 2
- iii. wherein further each of the deposit shield (50; Figure 3B; "chamber liner") and the shutter (60; Figure 2; column 4; lines 22-40) is configured to have a ground potential (column 8; lines 9-14), the shutter (60; Figure 2; column 4; lines 22-40) is configured to be retreated from the notch portion (94,96; Figure 9,10) when moving the substrate in and out of the stage (220; Figure 5; column 6; lines 59-67) through the carrier port (54; Figure 2; column 4; lines 22-40) and configured to be fitted into the notch portion of the deposit shield (50; Figure 3B; "chamber liner") when the plasma processing is conducted, thus surrounding a plasma generation region by the even curvature of the shutter (60; Figure 2; column 4; lines 22-40) and deposit shield (50; Figure 3B; "chamber liner") thereby producing a uniform plasma – claim 2
- iv. A vacuum processing apparatus (Figure 1; column 2; lines 10-21) for generating a plasma, comprises a vacuum processing chamber (24; Figure 1; column 4; lines 10-21)

having a stage (220; Figure 5; column 6; lines 59-67) for mounting a substrate to be subjected to a plasma processing, and a carrier port (54; Figure 2; column 4; lines 22-40) provided on a peripheral wall (a chamber “liner” must line the chamber inner wall 50, Figure 2,8) of the vacuum processing chamber (24; Figure 1; column 4; lines 10-21) for providing access to and from the stage (220; Figure 5; column 6; lines 59-67), said apparatus, comprising: a deposit shield (50; Figure 3B; “chamber liner”) disposed along an inner peripheral wall (a chamber “liner” must line the chamber inner wall 50, Figure 2,8) of the vacuum processing chamber (24; Figure 1; column 4; lines 10-21), said deposit shield (50; Figure 3B; “chamber liner”) having a notch portion (94,96; Figure 9,10) with a flat end face; a shutter (60; Figure 2; column 4; lines 22-40) being shaped to fit into the notch portion (94,96; Figure 9,10) of the deposit shield (50; Figure 3B; “chamber liner”) and being configured to be elevated, wherein, when the shutter (60; Figure 2; column 4; lines 22-40) is fitted inside the notch portion (94,96; Figure 9,10) of the deposit shield (50; Figure 3B; “chamber liner”), an inside surface of the shutter (60; Figure 2; column 4; lines 22-40) is substantially flush with an inside surface of the deposit shield (50; Figure 3B; “chamber liner”) – claim 3

- v. A vacuum processing apparatus (Figure 1; column 2; lines 10-21) for generating a plasma, comprises a vacuum processing chamber (24; Figure 1; column 4; lines 10-21) having a stage (220; Figure 5; column 6; lines 59-67) for mounting a substrate to be subjected to a plasma processing, and a carrier port (54; Figure 2; column 4; lines 22-40) provided on a peripheral wall (a chamber “liner” must line Welch’s chamber inner wall 50, Figure 2,8) of Welch’s vacuum processing chamber (24; Figure 1; column 4; lines 10-

Art Unit: 1763

21) for providing access to and from the stage, said apparatus, comprising: a deposit shield (50; Figure 3B; “chamber liner”) disposed along an inner peripheral wall (a chamber “liner” must line Welch’s chamber inner wall 50, Figure 2,8) of Welch’s vacuum processing chamber (24; Figure 1; column 4; lines 10-21), said deposit shield (50; Figure 3B; “chamber liner”) having a notch portion (94,96; Figure 9,10) at a position facing Welch’s carrier port (54; Figure 2; column 4; lines 22-40), Welch’s notch having an end face having an L-shape (see lower notch portion 94) cross section, a shutter (60; Figure 2; column 4; lines 22-40) being shaped to fit into Welch’s notch portion (94,96; Figure 9,10) of Welch’s deposit shield (50; Figure 3B; “chamber liner”) and being configured to be elevated, wherein, when the shutter (60; Figure 2; column 4; lines 22-40) is substantially flush with an inside surface of the deposit shield (50; Figure 3B; “chamber liner”) – claim 6

Welch does not teach:

- i. a sealing groove being configured to receive an O-ring therein, said sealing groove being formed in an end face of the shutter (60; Figure 2; column 4; lines 22-40) opposing a flat side face of the deposit shield (50; Figure 3B; “chamber liner”) – claims 1-3, 6
- ii. a groove being configured to receive therein a spiral seal made of metal, said groove formed in the end face of the shutter (60; Figure 2; column 4; lines 22-40) parallel to and outside of the sealing groove, the spiral seal electrically connecting the deposit shield (50; Figure 3B; “chamber liner”) to the shutter (60; Figure 2; column 4; lines 22-40) – claims 1-3, 6

Art Unit: 1763

- iii. Welch's end face of Welch's L-shape (see lower notch portion 94) cross section having a convex outer periphery – claim 6

Osaka teaches a gate valve shutter (32) with a groove (32/33 contour; Figure 2, 5) for fitting an o-ring (33 – see corresponding element on the other side of 32). The groove is shown to have a cross section having a square outer periphery. Maa teaches a metallic seal for a gate valve (column 1, lines 22-51).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Welch to add shape-compliant grooves around Welch's shutter to thereby accommodate a metallic O-ring as taught by Osaka and Maa.

Motivation for Welch to add shape-compliant grooves around Welch's shutter to thereby accommodate a metallic O-ring as taught by Osaka and Maa is to provide for a better hermetic seal between Welch's gate valve and seat therefore as taught by Osaka (“[Description of the Prior ART]”; Machine Translation) with an alternate and equivalent material of construction as taught by Maa.

4. Claims 4, 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Welch; Michael D. et al. (US 6,192,827 B1), Osaka et al (JP11-037315), and Maa (USPat. 4,771,805) in view of Hamrah et al (USPat. 5,242,538). Welch, Osaka, and Maa are discussed above. Welch, Osaka, and Maa do not teach:

- i. Welch's vacuum processing apparatus (Figure 1; column 2; lines 10-21) according to claim 3, wherein a disk-shaped evacuation plate is disposed around Welch's stage (220; Figure 5; column 6; lines 59-67), and Welch's shutter (60; Figure 2; column 4; lines 22-40) and the evacuation plate are brought into contact with each other and electrically

Art Unit: 1763

connected to each other when Welch's shutter (60; Figure 2; column 4; lines 22-40) is raised, as claimed by claim 4

- ii. Welch's vacuum processing apparatus (Figure 1; column 2; lines 10-21) according to claim 6, wherein a disk-shaped evacuation plate is disposed around Welch's stage (220; Figure 5; column 6; lines 59-67), and Welch's shutter (60; Figure 2; column 4; lines 22-40) and the evacuation plate are brought into contact with each other and electrically connected to each other when Welch's shutter (60; Figure 2; column 4; lines 22-40) is raised, as claimed by claim 7

Hamrah teaches a similar plasma processing apparatus (Figure 2) comprises a disk-shaped evacuation plate (96; Figure 2; column 3, lines 14-29) disposed around the stage (70).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a disk-shaped evacuation plate disposed around Welch's support stage as taught by Hamrah.

Motivation to add a disk-shaped evacuation plate disposed around Welch's support stage is to direct exhaust flow as taught by Hamrah (column 3, lines 14-29).

5. Claims 5, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Welch; Michael D. et al. (US 6,192,827 B1), Osaka et al (JP11-037315), and Maa (USPat. 4,771,805) in view of Steger et al (USPat. 5,788,799). Welch, Osaka, and Maa are discussed above. Welch, Osaka, and Maa do not teach:

- i. Welch's vacuum processing apparatus (Figure 1; column 2; lines 10-21) according to claim 3, wherein each of Welch's deposit shield (50; Figure 3B; "chamber liner") and

Art Unit: 1763

- Welch's shutter (60; Figure 2; column 4; lines 22-40) comprises a heating mechanism, as claimed by claim 5
- ii. Welch's vacuum processing apparatus (Figure 1; column 2; lines 10-21) according to claim 6, wherein each of Welch's deposit shield (50; Figure 3B; "chamber liner") and Welch's shutter (60; Figure 2; column 4; lines 22-40) comprises a heating mechanism, as claimed by claim 8
 - iii. Welch's deposit shield (50; Figure 3B; "chamber liner") having a first heating mechanism; and a shutter (60; Figure 2; column 4; lines 22-40) configured to be elevated (200, 210; Figure 6,8) along Welch's inner peripheral wall (a chamber "liner" must line Welch's chamber inner wall 50, Figure 2,8) of Welch's vacuum processing chamber (24; Figure 1; column 4; lines 10-21), said shutter (60; Figure 2; column 4; lines 22-40) having a second heating mechanism – claim 9

Steger teaches a similar plasma apparatus (Figure 1) including a chamber liner (102; column 6, lines 18-29) comprising a heating mechanism (110, Figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a heater in Welch's liner as taught by Steger.

Motivation to add a heater in Welch's liner as taught by Steger is to provide for thermal protection of the liner (column 6, lines 18-29).

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Welch; Michael D. et al. (US 6,192,827 B1), Osaka et al (JP11-037315), Maa (USPat. 4,771,805) and Steger et al (USPat. 5,788,799) in view of Hamrah et al (USPat. 5,242,538). Welch, Osaka, Maa, and Steger are discussed above. Welch, Osaka, Maa, and Steger do not teach Welch's vacuum processing

Art Unit: 1763

apparatus (Figure 1; column 2; lines 10-21) according to claim 9, wherein a disk-shaped evacuation plate is disposed around Welch's stage (220; Figure 5; column 6; lines 59-67), and Welch's shutter (60; Figure 2; column 4; lines 22-40) and the evacuation plate are brought into contact with each other and electrically connected to each other when Welch's shutter (60; Figure 2; column 4; lines 22-40) is raised, as claimed by claim 10

Hamrah teaches a similar plasma processing apparatus (Figure 2) comprises a disk-shaped evacuation plate (96; Figure 2; column 3, lines 14-29) disposed around the stage (70).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a disk-shaped evacuation plate disposed around Welch's support stage as taught by Hamrah.

Motivation to add a disk-shaped evacuation plate disposed around Welch's support stage is to direct exhaust flow as taught by Hamrah (column 3, lines 14-29).

Response to Arguments

7. Applicant's arguments with respect to claims 1-10 have been considered but are moot in view of the new grounds of rejection.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to

Art Unit: 1763

the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

Parviz Hassanzadeh
9/19/6